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A POSITIVE THEORY OF STRICT LIABILITY

KEITH N. HYLTON

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A Positive Theory of Strict Liability

Keith N. Hylton*

July 2007

Abstract: In spite of its tenure as the prevailing economic theory of strict liability, the proposition that strict liability should be preferred to negligence when it is desirable to reduce injurers' activity levels rather than victims' activity levels raises a few questions. First, when should we prefer to reduce injurers' activity levels rather than victims'? Second, why should we not hold both victim and injurer strictly liable? This paper provides a model that answers these questions more effectively than the prevailing economic model. The model presented here offers specific predictions that are consistent with the detailed law on strict liability and the appearance of strict liability in pockets rather than as an across-the-board default rule. The choice between strict liability and negligence depends on the degree to which there is a reciprocal exchange of risk among actors, and the extent to which benefits, in addition to risks, are externalized.

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I. Introduction

One of the fundamental parts of modern economic analysis of tort law is the distinction between *care* and *activity* levels. One can reduce the likelihood of an accident occurring by taking care or by reducing the level of activity. For example, the likelihood of a car accident can be reduced by driving with greater care – e.g., looking to both sides of the road more frequently or moderating the speed – or by driving less frequently.

The distinction between care and activity levels was introduced and treated informally in Calabresi (1970), and in Posner (1972), and received its first formal treatment in Shavell (1982). Shavell concluded that “strict liability is preferable to negligence if it is more desirable to control injurers’ activity than victims’.”¹ Landes and Posner (1987) applied this theory to explain the case law on strict liability. Posner applied the theory to analyze a strict liability claim in *Indiana Harbor Belt Railroad Co. v. American Cyanamid Co.*²

In spite of its tenure as the prevailing economic theory, the proposition that strict liability should be preferred to negligence when it is desirable to reduce the activity levels of injurers rather than the activity levels of victims raises several questions. When, precisely, should we prefer to reduce injurers’ activity levels rather than victims’? In the analysis of Shavell and in that of Landes and Posner, this question is answered by the observation that the law on strict liability seems to be consistent with the foregoing proposition. But the proposition itself has no predictive value. Further, why should we not hold both victim and injurer strictly liable? If strict liability serves the function of inducing actors to take externalized costs into account in choosing their activity levels, would it not be efficient to have a rule requiring both injurer and victim to suffer a loss in the event of an accident?

This paper provides a simple model that answers these questions more effectively, I contend, than the prevailing economic model. The model presented here offers specific predictions which are consistent with tort law, both in its general contours and details. Its predictions are consistent with the law on strict liability and the appearance of strict liability in pockets rather than as an across-the-board default rule.

At its core, the model in this paper examines the cross-externalization of risk that occurs when actors are jointly engaged in a potentially harmful activity, such as driving. The choice between strict liability and negligence depends on the degree to which there is a reciprocal exchange of risk among the actors, in the sense that the risks externalized by *A* to *B* are roughly the same as the risks externalized by *B* to *A*. The key result is that strict liability is preferable to negligence only when risks are nonreciprocal (or, equivalently, asymmetric).³ When risks are nonreciprocal, the negligence rule encourages high risk

¹ Shavell (1980), at 24.

² 916 F.2d 1174 (7th Cir. 1990).

³ Fletcher (1972) offers a corrective justice theory of tort law that concludes that strict liability is appropriate when risks are nonreciprocal. The model in this paper formalizes an economic theory that parallels Fletcher’s corrective justice account – and includes it as a special case of a more general model. It also formalizes and extends the argument in Hylton (1996). In terms of the economic literature on tort

externalizers to expand their activities and low risk externalizers to contract their activities, which magnifies losses. Strict liability leads to the opposite result, and is therefore preferable to negligence when externalized risks are asymmetric.

Another key feature of this model is its incorporation of externalized benefits. Because of externalized benefits, it may be socially desirable for the law to adopt a negligence rule instead of a rule of strict liability – independent of risk reciprocity. Moreover, in the absence of externalized benefits, liability rules would fail to bring about optimal deterrence in the typical accident setting, which involves bilateral risk.⁴ In order to fully internalize the risks that *A* and *B* cause by driving, both should be required to pay for the costs of accidents between them. Since liability rules fail to tax both of the participants to an accident, their incentives to engage in activity would be excessive were it not for the existence of external benefits. Incorporating external benefits enables this model to provide a positive account for a larger sample of common law rules. In particular, when external benefits are taken into account, doctrines limiting the duty to take care appear in this analysis to be part of a spectrum of liability rules, including strict liability and negligence, structured to optimally regulate activity levels.

By emphasizing externalization of risk and benefit, this paper returns to a view of tort law that is suggested in the early common law cases and reaches its clearest expression in *Rylands v. Fletcher*.⁵ The focus on externalization has been displaced or supplanted in modern analyses by a focus on the ability to avoid or control risk, an approach which was introduced by Calabresi. Examining the ability to avoid or control risk rather than the tendency to externalize risk may be better as an operational or normative theory of the function of tort law. However, as Calabresi argued, the cheapest cost avoider theory appears not to provide a robust theory of the common law of torts. The externalization-based model presented here does provide a detailed rationale of common law tort doctrine, and in this sense points the way toward a deeper understanding of the function of specific tort doctrines.

Part II provides an intuitive account of the model in this paper. Part III presents the model and extensions. Part IV applies the model to explain the common law of torts. In terms of increasing strictness on potential tortfeasors, the rules of tort law fall into no-duty rules, negligence rules, and strict liability rules. The model of this paper provides an explanation for these general categories as well as a rationale for specific doctrines within each category.

II. An Intuitive Account

rules, one immediate implication of the “reciprocal risk” condition is that the claim that strict liability affects activity levels while negligence does not is incorrect even in the unilateral care case.

⁴ If two actors are imposing a risk of \$10 on each other, internalizing external costs requires the imposition of a \$10 tax on both. See Edlin (2003).

⁵ *Fletcher v. Rylands*, L.R. 1 Ex. 265 (1866); *Rylands v. Fletcher*, L.R. 3 H.L. 330 (1868).

In the model below, accidents occur in a setting in which risks are jointly incurred or cross-externalized. Driving provides a simple and common example. Suppose every driver takes care. Even though driver *A* takes care, he still imposes some risk on other drivers, because even when *A* is taking care, there is still a positive probability that he will crash his car into another driver. If the chance of such an accident occurring is 1 out of every 1000 miles driven, and the average harm imposed is \$10,000, the expected value of the risk externalized by *A* is \$10 per mile. Given this scenario, the externalized risk imposed *on A* by every other driver (within range to have an accident) is also \$10 per mile per driver.

In order to internalize these costs to drivers, some penalty must be applied that forces each driver to incur a cost of \$10 per mile. One approach would be to apply a tax on driving. An alternative would be to include a tax on the purchase of gasoline. However, most conventional liability rules will fail to internalize the cost. Under strict liability, *A* would compensate *B* for the harm imposed in an accident for which *A* is responsible, but *B* would pay nothing, which is inadequate as a method of internalizing the activity cost of risk.⁶

Risk is not the only cost associated with the activity of driving. There is also the cost of taking care, if the driver chooses to do so. There is also the direct cost of capital exhaustion or depreciation of the car, and the time and physical exhaustion costs of driving. However, capital depreciation and physical exhaustion costs are borne directly by the driver, so there is no need to use a liability rule to encourage him to take them into account.

This description of the standard accident setting is incomplete because it leaves out external benefits. Activities often cross-externalize benefits in addition to risks. Return to the driving example. Having more than one driver on the road often benefits the typical driver. One obvious example is safety from crime. Highwaymen and pirates have existed for millennia primarily because they take advantage of low-volume traffic routes. If the benefit externalized by each driver is \$10 per mile, it would fully offset the externalized risk, and there would be no need to apply a corrective tax in order to reduce activity levels.

A key argument of this paper can be conveyed within this simple illustration. One well established argument for strict liability is that it internalizes the costs of activity risk and therefore provides incentives for actors to choose efficient activity levels. But this argument is not generally valid in a setting of cross-externalization. Under strict liability, driver *A* externalizes \$10 per mile and pays for it, but he is compensated for the risk driver *B* imposes on him, which is \$10 per mile. Thus, the net cost of risk to *A*, as a component of the activity costs incurred by *A*, is \$10 per mile under strict liability. Under negligence, driver *A* externalizes \$10 of risk and does not pay for it (because he takes care). However, he bears the cost that driver *B* imposes on him, which is \$10 per

⁶ I focus on representative drivers *A* and *B* to simplify the discussion. If we multiply the number of drivers, while still assuming pairwise accidents, the presence of other drivers increases the risk imposed on *A*, but also increases the risk *A* externalizes. I will return to this question in the margins of the formal analysis.

mile. Thus, the net cost of risk as a component of activity costs incurred by A is \$10 per mile under negligence. Since the costs of activity risk to A are the same under both rules, there is no reason on deterrence grounds to choose strict liability over negligence. Indeed, if people are more attentive to their own injuries than to those of others for which they must pay, which seems a reasonable assumption, switching from negligence to strict liability would lead to greater externalization of the costs of activity risk.

One might argue that this is also a case in which there is no reason to control the injurer's activity levels rather than the victim's. However, returning to the argument of the introduction, why is it that there is no reason in this example to control the injurer's activity level instead of the victim's? The answer is that there is a reciprocal exchange of risk. This paper extends the Shavell-Landes-Posner analysis by explicitly modeling the underlying factors that make it desirable to regulate the activity of the injurer rather than that of the victim. This explicit modeling, I show in the remainder, provides additional insights into the common law of torts.

III. Model

The total number or frequency of injuries in this model is influenced by care and activity levels. The likelihood of an injury occurring, for any given level of activity, is simply a function of the level of care taken by the parties who might be involved in an accident. To give a concrete example, suppose "the activity" is driving an automobile. The likelihood of an accident involving two drivers occurring at any moment is entirely a function of the level of care taken by the two drivers. However, as more actors drive, more accidents are likely to result.

A. Care

All actors are risk neutral. An actor can reduce the likelihood of injuring someone in an accident by taking care, which is costly. I will assume that the likelihood that an actor *causes* an accident is a function of that actor's level of care alone,⁷ independent of the level of care or the activity level of other actors.

Let p_i be the probability, per unit of activity, that actor i causes an injury to another actor if actor i does not take care, $p_i > 0$. Let q_i be the probability, per unit of activity, that actor i causes an injury if actor i does take care $0 < q_i < p_i$. For example, if actor i is driving a car, q_i would represent the probability that actor i crashes his car into another driver even though actor i is driving carefully.⁸

⁷ The explicit incorporation of causal considerations is one feature distinguishing this model from that of Shavell (1980).

⁸ Of course, cause is an imprecise term. One could say that the victim B caused the car accident by being in the place to which A veered his car. However, the more intuitive sense of cause implies some direct action on one actor's part that deviates from the norm and leads to contact with another person. See Epstein (1972).

This is a model of *unilateral* (or identifiable) *causation* and *unilateral risk*. This can be contrasted with models of bilateral or unidentifiable causation in which the probability that an accident occurs is simply a function of the care levels of two or more parties.⁹ It can also be contrasted with models of bilateral risk, e.g., Arlen (1992), in which both parties to every accident suffer injury. The assumptions of unilateral risk and unilateral causation enable this model to capture its key results with minimum complexity.¹⁰

Let v represent the loss (per unit of activity) that occurs as the result of an accident, and x represent both the level and the cost of taking care per unit of activity. Assume, to simplify further, that an actor can choose one of only two possible care levels. One is “no care”, which is $x = 0$. The other is “reasonable care”, which is $x = x_r$. I will assume that $x_r + q_i v < p_i v$, which means that reasonable care is both privately and socially desirable.

There are two representative actors A and B . If both take care, an accident can occur in three ways. One way is that both actors cause the accident, in which case the likelihood of injury (to both actors) is $q_A q_B$. Another way is that A causes the accident while B does not, $q_A(1 - q_B)$, in which case B is injured and A is not injured. The third way is that B causes the injury while A does not, $q_B(1 - q_A)$. The same three causal pathways just described apply to the cases in which A takes care and B does not, and the remaining two cases (B takes care, A does not; neither A nor B take care). This generates twelve causal pathways to consider. However, we will not need to consider all of them in the core part of this paper, which examines incentives affecting activity level choices.

Litigation is assumed to be costless and courts operate without error.¹¹ Since all victims of accidents will sue and prevail in court, an actor will take reasonable care whenever the incremental liability that he incurs by failing to take care exceeds the cost of reasonable care x_r .

⁹ Most of the models examined in the literature, starting perhaps with Diamond (1974), can be described as bilateral causation models. For example, in Shavell (1980) and in Arlen (1992) the probability of an accident is a function of the level of care of both injurer and victim. In that specification, causation is not easily traceable, and so it makes sense to speak of an accident occurring without reference to an identifiable cause. I refer to an actor “causing” an accident in this model because the occurrence of an accident is traceable to an identifiable actor. In addition, in Arlen (1992), both parties are injured as a result of an accident, making it a model of bilateral risk. In this paper’s model, only one party suffers harm in accident caused by another, making it a model of unilateral risk as well as unilateral causation.

¹⁰ I am aware of no other models that explore unilateral causation in a setting in which both parties can cause an accident. The standard approach in unilateral causation models is to assume that only one party (typically the injurer) can cause an accident, see, e.g., Hylton (1990) for such an approach. In addition to the tractability advantage of the unilateral causation assumption, it is my impression from teaching tort law that the unilateral causation model captures the implicit assumptions held by the courts that decide tort cases. It should be easier within a model whose mathematical foundations mirror the implicit assumptions of courts to generate predictions that match the decisions of the courts.

¹¹ When litigation is costly and judicial error possible, many of the results of analyses that assume costless and error-free litigation are modified, see Hylton (1990). Landes and Posner (1987) incorporate litigation costs into their analysis informally.

Under a rule of *strict liability for causing harm*, the actor will be held strictly liable – that is, liable whether or not he took reasonable care – whenever he causes harm to another actor. For simplicity, I will refer to this liability rule as *strict liability*. Suppose *B* takes care and *A* does not take care. *A*'s expected cost under this scenario is

$$p_A q_B [(v-v) + v] + p_A (1 - q_B) [0 + v] + (1 - p_A) q_B [(v-v) + 0] + (1 - p_A) (1 - q_B) [0 + 0], \quad (1)$$

which is equal to $p_A v$. The first term in (1) shows the case in which both parties cause harm, while only *B* takes care. In that case, *A* is compensated for his own harm ($v-v$) and must compensate *B* for the harm he suffers. In the second case, *A* causes harm to *B*, while *B* takes care and does not cause harm to *A*. In the third case, *A* does not take care and does not cause harm to *B*, while *B* takes care and causes harm to *A* (for which *A* is compensated). In the last case, neither party causes harm. The same accounting exercise leads to the conclusion that when *B* takes care and *A* takes care, *A*'s expected cost is equal to $q_A v$. Moreover, the same results hold for the scenarios in which *B* does not take care: the incremental liability to *A* for failing to take care is $(p_A - q_A)v$.

It follows from the foregoing that a sufficient condition for either actor to take care is $x_r + q_i v < p_i v$, which has been assumed to hold. Thus, actors take reasonable care under strict liability. Moreover, it follows that actors will take reasonable care under a rule of liability for *negligently causing harm* – or, simply, *negligence*. The reason is that the incremental liability for failing to take care under strict liability is $(p_i - q_i)v$, while incremental liability for failing to take care under negligence is $p_i v$. Since incremental liability is larger under negligence, the assumption that $x_r < (p_i - q_i)v$ implies that actors take care under negligence. In addition, it also follows that actors will take care under either the strict liability or the negligence rule when there is a defense of contributory negligence added to the rule.¹²

What has been demonstrated to this point is that in a model of unilateral causation of harm, with discrete care choices, actors will take reasonable care as long as the incremental liability for failing to take care exceeds the cost of taking care.¹³

B. Activity

A representative actor's activity level is given by y . The total cost of engaging in an activity is the activity level, y , multiplied by the cost per unit of the activity, $C(y)$. Similarly, the total benefit from engaging in an activity is equal to the activity level, y , multiplied by the benefit per unit of activity $B(y)$.

¹² John Prather Brown (1973), Haddock and Curran (1985).

¹³ This result may seem hard to reconcile on intuitive grounds with the notion that strict liability dilutes the incentives of potential accident victims to take care. This effect is not observed in this model because of the model's assumption of unilaterally caused harm. The victim's care has no effect on the likelihood that he will be harmed, only on the likelihood that he harms someone else. The model could be made more complicated by incorporating bilateral harm in each accident. But this would complicate matters without disturbing the key results of this model.

Activities are assumed to be jointly-engaged or commingled in the sense that some of the costs and some of the benefits of an actor's activity are externalized to other actors. If an actor increases the level of his activity, he may increase the risk that another actor will suffer an injury. For example, a decision by A to drive more frequently increases the risk that another driver B will be injured. However, there are benefits that may be externalized too. A decision by A to drive more frequently may provide a benefit to B , perhaps by reducing the need for B to drive or by increasing the security that B perceives since B will not be on the road alone.

From the foregoing, it should be clear that we can distinguish between the private and social costs of an activity. Let $C_{Soc}(y)$ represent the social cost per unit of activity, and let $C_{Priv}(y)$ represent the private cost to the actor per unit of activity.

The social cost of activity is made up of several parts. First, there is the cost of taking care, per unit of activity, x_r . Second, there is the depreciation or capital exhaustion that occurs as a byproduct of any activity. For example, the activity of driving involves wear-and-tear on one's car. Of course, capital exhaustion could include the physical exhaustion or disutility of devoting longer hours to a given activity. Let the depreciation component be given by $\delta(y) > 0$, where $\delta'(y) > 0$ and $\delta''(y) \leq 0$. The third component is the cost of accidents; in the form of losses suffered by the actor and others.

Given the relationship between the cost of care and the marginal liability from failing to take care, both A and B take care. Of course, even though both A and B are taking care, accidents still happen. Since accidents can be caused by A or by B , the *social cost* of either actor's activity is¹⁴

$$y C_{Soc}(y) = y(x_r + \delta(y) + q_A(1 - q_B)v + (1 - q_A)q_Bv + 2q_Aq_Bv) \quad (2)$$

$$= y(x_r + \delta(y) + q_Av + q_Bv). \quad (3)$$

The private cost of activity differs from the social cost (equation (3)) because it takes into account only the costs borne by the actor whose activity level is being measured. These would include direct losses and the cost of liability judgments against the actor. Since the private cost depends on the legal rule, specifically whether it is one of strict liability or negligence, it will be specified later in this paper.

Recall that the benefit per unit of an activity is $B(y)$. The total benefit from engaging in an activity is therefore $yB(y)$. The benefit from an activity depends on so many factors, such as individual tastes, that it cannot be specified with the same detail as the cost. However, the benefit can be separated into private and social benefits – or private and

¹⁴ Suppose instead of two representative actors, we have three (still assuming pairwise accidents). Then the risks imposed on A by both of the other two drivers must be taken into account in expression (3). However, in this scenario A will impose risk on both of the other two drivers. If there are $N-1$ other drivers, the activity risk factor becomes:

$$(N-1)q_A + \sum_{i=1}^{N-1} q_i \cdot$$

external components. If the probability of a benefit being conferred on another is w , and z is the benefit per unit of activity,

$$yB_{Soc}(y) = y(b(y) + w_A z + w_B z), \quad (4)$$

where $b(y) > 0$, $b'(y) < 0$, $b''(y) \geq 0$. The assumption $b(y)$ is decreasing reflects an underlying assumption of declining marginal utility from additional activity.

The socially optimal level of activity equates the marginal social cost of an activity with its marginal social benefit. Thus, the socially optimal activity level satisfies

$$x_r + \delta(y^*) + q_A v + q_B v + y^* \delta'(y^*) = b(y^*) + w_A z + w_B z + y^* b'(y^*). \quad (5)$$

Figure 1 illustrates the socially optimal activity level y^* . The risk externality component $(q_A + q_B)v$ and the benefit externality component $(w_A + w_B)z$ are both shown as vertical shifts in Figure 1. If there were no externalized benefits, the marginal social benefit of activity would be the lower downward-sloping curve in Figure 1; similarly, if there were no externalized risks, the marginal social cost would be the lower upward-sloping curve.

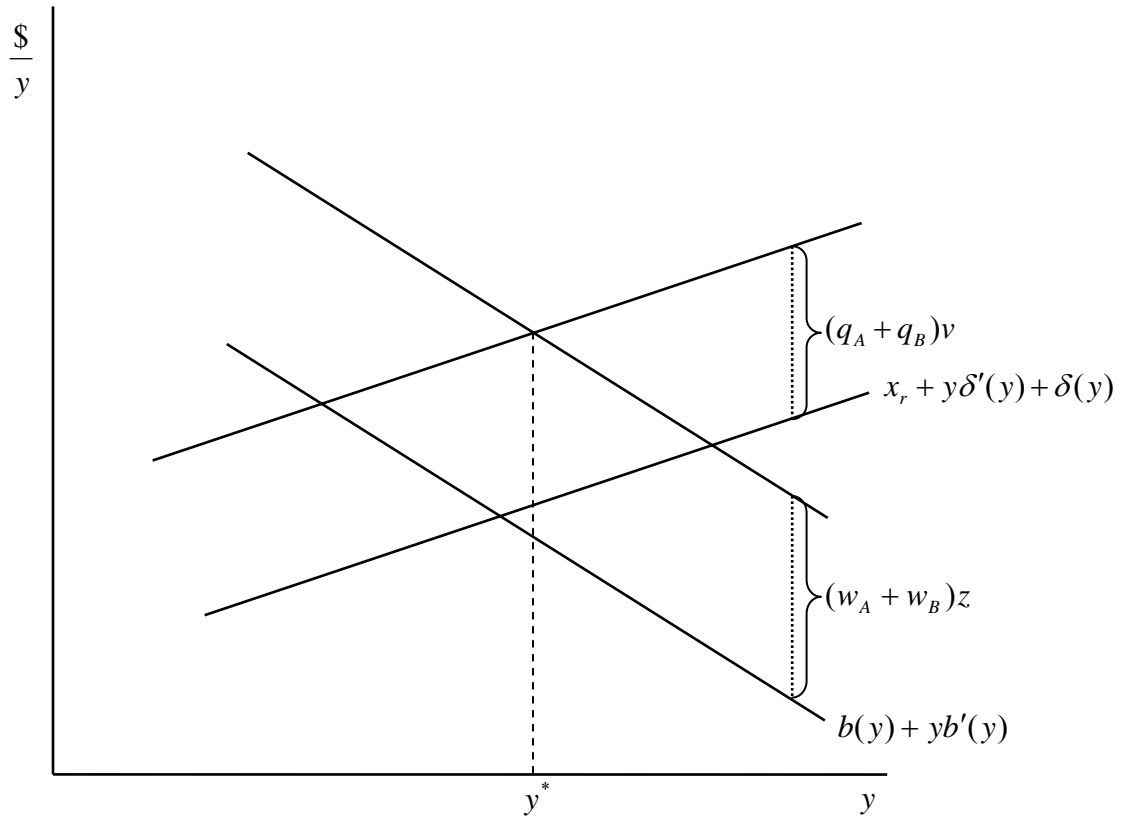


Figure 1: Socially Optimal Level of Activity

C. Strict Liability and Negligence Compared

I now consider the private activity cost for a representative actor under strict liability. Given that the actor takes care under the strict liability rule, the private activity cost is a function of the cost of taking care, the depreciation cost of activity, and the liability and losses suffered. Adopting the more cumbersome expression (1), the private cost of A 's activity under strict liability is

$$yC_{Priv}(y) = y(x_r + \delta(y) + q_A(1 - q_B)v + (1 - q_A)q_B(v - v) + q_Aq_B[(v - v) + v]). \quad (6)$$

The third term is the liability expected by the actor under strict liability, since he is liable even though he has taken care. The third component reflects the expected costs in the scenario in which A causes the accident and B does not cause it (in other words, A , though taking care, crashes into B , who may have been parked at a red light). The fourth term is the direct loss suffered by the actor, which is zero because he is compensated. This is the case in which B causes the accident and A does not. The fifth term shows the scenario in which both cause the accident (A and B , though both acting with care, crash their cars into each other). In the fifth term, A receives full compensation for his loss, but must pay for B 's loss. Simplifying, the private cost of A 's activity under strict liability is

$$yC_{Priv}(y) = y(x_r + \delta(y) + q_Av). \quad (7)$$

A similar argument allows us to see that the private activity cost to A under negligence is

$$yC_{Priv}(y) = y(x_r + \delta(y) + q_Bv). \quad (8)$$

These expressions indicate that the private activity cost to an actor differ in intuitively plausible ways under strict liability and under negligence. Under strict liability, the activity cost to A is a function of his own likelihood of causing an injury to B . Under negligence, A 's activity cost is a function of B 's likelihood of causing an injury to A .

While it has become common to describe strict liability as a rule that regulates activity levels, these expressions show that both rules regulate activity levels. They do so in different ways. Under strict liability, an actor will have a stronger incentive to reduce his activity level, because of the threat of liability, as the level of risk he externalizes to other actors increases. Under negligence, the actor will have a stronger incentive to reduce his activity level, because he will suffer an uncompensated injury, as the level of risk externalized by other actors increases.¹⁵

Indeed, a simple proposition follows from the foregoing.

¹⁵ The point that both strict liability and negligence regulate activity levels is made in Landes and Posner, at 69. Landes and Posner note that strict liability fails to control the activity level of the victim, while negligence does. This analysis differs from theirs by identifying relative risk externalization as the reason that the rules have predictable effects on activity levels. The remaining analysis in the text explores the different implications of this approach.

If $q_A > q_B$, holding A strictly liable is preferable to using the negligence rule in regulating the activity level of A. If, however, $q_A \leq q_B$, strict liability is not preferable to negligence. In simpler terms, if A externalizes more risk to others than they externalize to him, strict liability is preferable to negligence. However, if there is a reciprocal exchange of risk between A and B, or if B externalizes more risk than does A, holding A strictly liable is not preferable, as a method of regulating A's activity level choice, to the negligence rule.

Another proposition, which is both simple and startling, follows.

If there is reciprocal exchange of risk between A and B ($q_A = q_B$), strict liability and negligence provide the same incentives for care and for activity level choices.

The intuition supporting this last claim is easy to state. Since everyone takes care both under strict liability and under negligence, the only differences between the two regimes will appear in the consequences associated with the allocation of liability. Given that the marginal costs of taking care and of capital exhaustion are the same under both rules, differences in activity level choices will be driven by differences in the allocation of liability. Under negligence, in choosing the scale at which you will engage in an activity, you need only consider (in addition to care and capital costs) the costs of injuries to yourself caused by others who took care. Under strict liability, you will be compensated for injuries, so in choosing the scale at which you will engage in an activity, you need only consider (in addition to care and capital costs) the expected liability payments to others from accidents you cause even though you are taking care. If risks are reciprocal, these costs are the same.¹⁶

Under strict liability, the privately optimal activity level will be determined by equating the marginal private benefit with the marginal private cost of activity. On the benefit side, A will consider only the external benefits conferred on him by B, not the benefits that he confers on B. Thus, A's privately optimal activity level choice under strict liability will be \bar{y}_s , which satisfies:

$$x_r + \delta(\bar{y}_s) + q_{AV} + \bar{y}_s \delta'(\bar{y}_s) = b(\bar{y}_s) + w_{BZ} + \bar{y}_s b'(\bar{y}_s). \quad (9)$$

The left hand side is the private marginal cost to A of activity under strict liability, the right hand side is the private marginal benefit to A of activity. Under negligence, the privately optimal activity level will again be determined by equating the marginal private benefit of activity with its private marginal cost. Thus, under negligence, A's privately optimal activity level will be \bar{y}_n , which satisfies:

$$x_r + \delta(\bar{y}_n) + q_{BV} + \bar{y}_n \delta'(\bar{y}_n) = b(\bar{y}_n) + w_{BZ} + \bar{y}_n b'(\bar{y}_n). \quad (10)$$

¹⁶ In the case of N actors, we should compare the risk externalized by A to that of the average of the remaining actors:

$$q_A > (N-1)^{-1} \sum_{i=1}^{N-1} q_i$$

Reciprocal risk generation among the remaining actors implies a low variance among the q_i terms.

It is straightforward to show that the private activity level choice of A is higher under negligence than under strict liability if and only if $q_A > q_B$ (see Figure 2). Of course, A 's activity level choice is the same under strict liability and under negligence if $q_A = q_B$.

The reciprocal nature of liability rules is evident in the marginal conditions just described. Under strict liability, A , when choosing his level of activity, is concerned with his liability for the risk he externalizes to others, even when he is taking care. Under negligence, A is concerned with the risk externalized by others to him. Thus, if A externalizes more risk than B and the negligence rule applies to accidents, A will be encouraged to choose a higher level of activity than he would choose under strict liability, while B simultaneously will be encouraged to choose a lower level of activity than he would choose under the strict liability rule. Where there is asymmetry in risk externalization, negligence causes high risk-externalizers to increase their activity levels while low risk-externalizers decrease their activity levels.

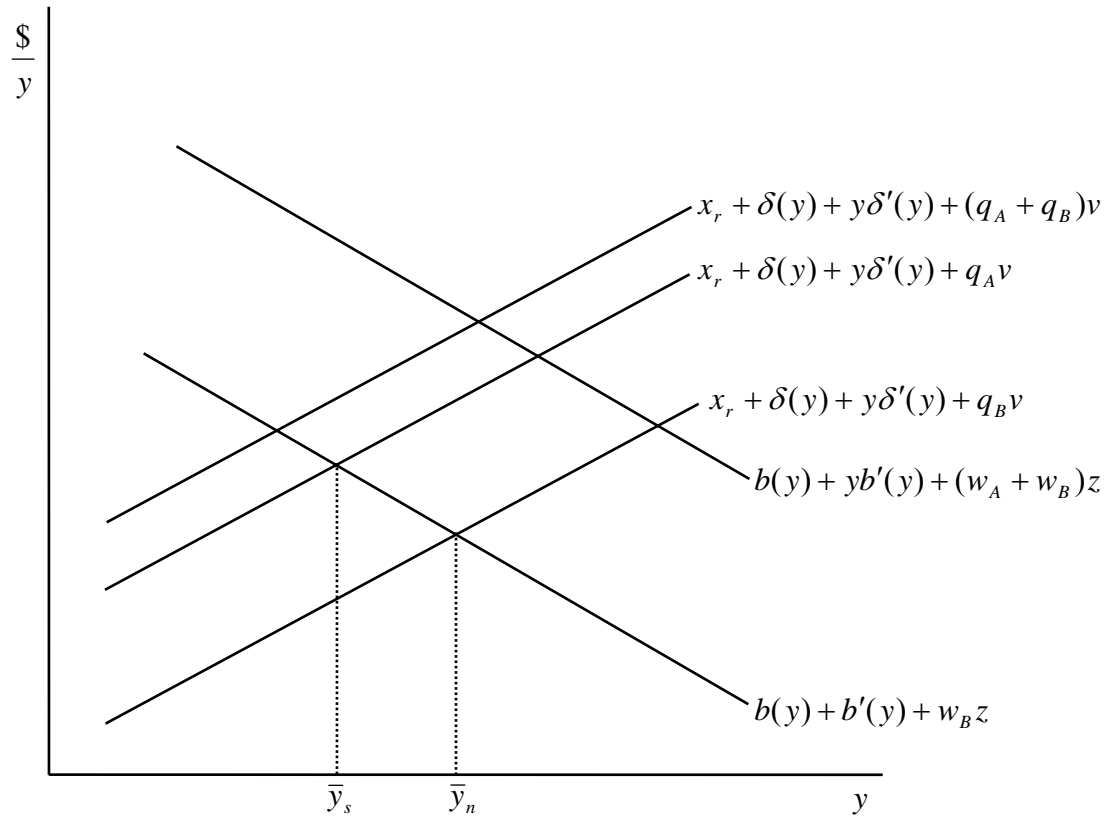


Figure 2: Privately Optimal Activity Choices Under Strict Liability and Under Negligence

D. Comparing Private to Social Activity Incentives

The socially optimal activity level choice equates the marginal social cost of activity with its marginal social benefit. This is described by equation (5). The privately optimal activity level choice equates the marginal private cost of activity with its marginal private benefit. For the case of strict liability, this is described by (9). For the case of negligence, the privately optimal activity level choice is described by (10). Since $q_A + q_B > q_A$, and $q_A + q_B > q_B$, it would appear that both strict liability and negligence are inadequate from a social perspective as regulators of activity levels. That is, since both strict liability and negligence fail to fully internalize the marginal social costs of an extra unit of activity, one might jump to the conclusion that both rules fail to give actors an incentive to adopt the socially desirable level of activity.¹⁷

But that conclusion would be premature. Consider strict liability. Although strict liability fails to fully internalize the marginal social cost of activity, it is also true that the actor may fail to take into account the full marginal social benefit of his activity.

As Figure 2 illustrates, the marginal social cost curve, $x_r + \delta(y) + q_A v + q_B v + y\delta'(y)$, is to the left of the marginal private cost curve under strict liability, $x_r + \delta(y) + q_A v + y\delta'(y)$. This is because the actor, anticipating full compensation, discounts the harm to himself from increasing his level of activity. However, the marginal social benefit curve, $b(y) + w_A z + w_B z + yb'(y)$, is to the right of the actor's marginal private benefit curve, $b(y) + w_B z + yb'(y)$. In other words, the multiplier that applies to externalized risk also applies to externalized benefits. This implies that it is ambiguous, a priori, whether private activity level choices under strict liability are greater than the socially optimal level.

The implications of benefit externalization should be considered along with those of risk externalization. In the previous part, it was demonstrated that if there is a reciprocal exchange of risk between *A* and *B* ($q_A = q_B$), then strict liability is not preferable to the negligence rule – both have the same effects on activity levels. In this part, it is demonstrated that even if *A* externalizes more risk than does *B*, it still does not follow that strict liability should be preferred to negligence on welfare grounds. To determine whether strict liability is socially preferable to negligence requires some comparison of risk externalization and benefit externalization.

Four general scenarios immediately invite inspection: (1) $q_A > q_B$, $w_A > w_B$; (2) $q_A > q_B$, $w_A \leq w_B$; (3) $q_A \leq q_B$, $w_A > w_B$; (4) $q_A \leq q_B$, $w_A \leq w_B$. In the first, actor *A* externalizes both costs and benefits to a higher degree than the typical actor in the rest of the population. In the second, *A* externalizes more risk than is the norm, and is the same or less than the norm in terms of benefit externalization. In the third, *A* externalizes no more risk than the norm, but externalizes more benefit than the typical actor. In the fourth, *A* externalizes no additional risk, and no additional benefit relative to the norm.

¹⁷ Edlin (2003), Shavell (1980).

The scenario in which strict liability is most likely to improve welfare is the second, in which the actor externalizes more risk than the norm but no additional benefit. In this case, negligence will clearly fail to provide the proper activity level incentives. And since the actor does not externalize additional benefit, there is no reason not to use liability in order to tax his activity.

The scenario in which the actor externalizes no additional risk, but does externalize additional benefits, is one in which the ideal legal rule would provide a subsidy in order to encourage the activity. One way in which the law could provide such a subsidy would be to relieve the actor of a duty to take care. Of course, an actor who is relieved of the duty to take care would set his care level at zero, which increases the risk of harm. This suggests that the most likely subsidy provided through the law – relieving an actor of the duty of care – will be limited to a narrow set of circumstances in which the increased risk of harm is slight relative to the gains from encouraging the underlying activity (in terms of the model, $p_A \approx q_A$, $q_A \leq q_B$, and $w_A > w_B$).

The following table provides a rough summary of the implications of this model

	$w_A > w_B$	$w_A \leq w_B$
$q_A > q_B$	Negligence (probably)	Strict Liability
$q_A \leq q_B$	Subsidy (e.g., No duty)	Negligence

This table suggests that subsidy and strict liability (taxation) rules are likely to be rare in comparison to negligence rules. Negligence rules are likely to predominate because they are efficient when risks are roughly reciprocal and when externalized benefits are roughly the same as externalized costs. Reciprocal exchanges of risks or symmetrical risk-benefit externalization are likely to be observed more often than non-reciprocal exchanges because communities are likely to form around activities that cross-externalize similar risks.

E. Extension to Market Activities

To this point I have considered accidents between strangers. Now I extend the model to consider market activities. Obviously, people who interact in the market are often strangers. But the difference between the market setting and other settings is that there is usually an opportunity, in the market setting, for the potential participants in an accident to bargain about the externalized costs (and benefits) before the accident occurs.

To describe the market setting, I will re-label the terms used before. Let y represent the number of units of some item – e.g., widgets. Let A be the seller and B be the buyer. The

activity social cost schedule, expression (3), now represents the social cost of offering y . The activity social benefit schedule, expression (4), now represents the social benefit of obtaining y .

There are several different types of market transaction. The most common is the goods market – e.g., involving transactions between consumers and sellers of widgets. An alternative model is that of the labor market, where sellers of labor (workers) contract with buyers of labor (employers). Yet another model is that of the land market. I will focus here on the goods market and consider special features of the labor and land markets at the conclusion of this discussion.

In a world of pure barter, costs and benefits could easily be cross-externalized in the sense studied earlier. If I trade arrowheads with you in return for beef, we may expose each other to a risk of harm. The arrowhead I give you may be faulty. The beef you give me in exchange may be contaminated. If the risks are reciprocal, strict liability and negligence lead to the same incentives for care and activity levels.

Introducing money dramatically reduces the risk that the buyer will externalize risk to the seller. This is perhaps the key reason money reduces the transaction costs of the market, and increases social welfare relative to a barter system. Assume that the likelihood the buyer causes harm to the seller is now zero, i.e., $q_B = 0$. Assume in addition, that there are no external benefits in the transaction, all benefits are observed by the parties and taken into account in their contract. Under these assumptions, the activity social cost schedule becomes

$$yC_{Soc}(y) = y(x_r + \delta(y) + q_{Av}). \quad (11)$$

The social cost of selling y widgets is the cost of taking care in design, production, and distribution; the cost of design, production, and distribution; and the expected cost of harm to buyers.

Since risks are not cross-externalized by buyers, the analysis to this point seems to suggest that strict liability of the seller is the best rule. The reason is that the activity private cost schedule, under a negligence rule, is

$$yC_{Priv}(y) = y(x_r + \delta(y)), \quad (12)$$

and since the private cost schedule of the seller does not include the externalized risk component, sellers will sell their goods at prices that do not reflect the risk. This, in turn, suggests that the market outcome is likely to be one in which the goods are over-consumed relative to the social optimum (Polinsky, 1980).

However, the conclusion that the market results in over-consumption is not necessarily valid. The market outcome is determined in part by the demand schedule, which itself is derived from the activity benefit schedule. If buyers can observe the risk connected to consuming the product, they will take it into account when considering their benefits. If

buyers can observe the risk component, the activity (or consumption) private benefit schedule becomes

$$yB_{Priv}(y) = y(b(y) - q_{Av}), \quad (13)$$

because the buyer discounts the benefit from consumption by the expected loss from injury. Given this, strict liability and negligence lead to the same consumption levels.¹⁸ To see this clearly in terms of the model, A 's privately optimal activity level choice under negligence is \bar{y}_n , which satisfies:

$$x_r + \delta(\bar{y}_n) + \bar{y}_n \delta'(\bar{y}_n) = b(\bar{y}_n) - q_{Av} + \bar{y}_n b'(\bar{y}_n). \quad (14)$$

The left hand side is the private marginal cost of activity to A and the right hand side is the private marginal benefit. Under strict liability, A 's optimal activity level choice satisfies:

$$x_r + \delta(\bar{y}_s) + q_{Av} + \bar{y}_s \delta'(\bar{y}_s) = b(\bar{y}_s) + \bar{y}_s b'(\bar{y}_s). \quad (15)$$

Since these equations are the same, the activity level (or, equivalently, consumption level) choices under strict liability and under negligence will be the same (i.e., $\bar{y}_s = \bar{y}_n$). If the buyer misperceives the risk of consuming the product, strict liability and negligence may not lead to the same consumption levels (Spence, 1977). In particular, if the buyer under-perceives the risk, he will over-consume the product relative to the social optimum; and if he over-perceives the risk, he will under-consume the product. In both scenarios, strict liability would generate optimal consumption levels.

As a general matter, the equivalence of strict liability and negligence in terms of their effects on consumption levels when buyers accurately perceive risks should depend on whether the risk component is created in the design, production, or distribution stage of the supply chain. Designs, as well as their risk characteristics, are often easy to observe by potential buyers. Hazards created in the production and distribution processes, are comparatively less observable. One can look at a convertible car and tell immediately that it will not prevent you from being ejected during a roll-over accident. However, staring at a convertible car will not tell you whether the mechanics assembled or tested components carefully.

Now consider the case in which *benefits* are externalized from the seller to the buyer. In most cases, benefit externalization should not be observed. Sellers have every incentive to find a way to earn revenue for every benefit conferred on someone by their product. But there are important counterexamples. For example, consider vaccines. By reducing the spread of a disease, a vaccine can provide external benefits to buyers and to the general population. It follows from the foregoing (see Figure 2) that even if buyers under-perceive the risks, strict liability may not be socially desirable.

¹⁸ Buchanan (1970).

Another example of benefit externalization by sellers is provided by newspaper or other information-disseminating products, such as the internet. Information is a public good, which means that benefits are provided beyond the group of immediate buyers. A strict liability rule would probably push consumption below the socially desirable level.

This analysis applies easily to the labor market setting, where the buyer is the employer and seller is the worker. Again, the process of risk creation can occur at the design or operational stage. Hazards created at the design stage, such as the decision to use a relatively risky technology rather than a safer alternative, are often observable to all participants in the enterprise. As a general rule, design-specific hazards should be relatively more observable than operation-specific hazards.

In the case of the land market, risks are often associated with fixed features of the landscape. A person may purchase a parcel of land at the bottom of steep hill, where there is an obvious risk that boulders at the top of the hill will roll down onto the parcel. Alternatively, a person may purchase a building located at a busy intersection of two roads, taking on the risk from injuries to the property caused by passing traffic. In these examples, the purchaser is aware of the risk and discounts the purchase price accordingly. Given this, strict liability and negligence have the same effects on purchaser's location decisions.

IV. Applications to Law

Strict liability is appropriate on welfare grounds, under this model, only when the potential tortfeasor externalizes more risk than the typical actor and also does not externalize additional benefit. I will argue below that this general picture is consistent with the law on strict liability.

A. Strict Liability for Dangerous Activities

The clearest application of this model is in the context of strict liability for "abnormally dangerous activities". The law in this area has its roots in the famous *Rylands v. Fletcher* decision, which has been codified, more or less, in the Restatement (Second) of Torts. Section 520 of the Second Restatement provides the following:

In determining whether an activity is abnormally dangerous, the following factors are to be considered:

- (a) existence of a high degree of risk of some harm to the person, land or chattels of others;
- (b) likelihood that the harm that results from it will be great;
- (c) inability to eliminate the risk by the exercise of reasonable care;
- (d) extent to which the activity is not a matter of common usage;
- (e) inappropriateness of the activity to the place where it is carried on and;

- (f) extent to which its value to the community is outweighed by its dangerous attributes.

The function of the Restatement test is easy to understand under the model presented here. The first three components of this test ask, in essence, whether the risk externalized by the actor, even when he is taking care, is greater than the norm – in other words, whether $q_A > q_B$. In other words, in terms of the cost-curve diagram in Figure 1, the test asks whether holding the actor strictly liable, rather than liable only for negligence, would lead to a substantial upward shift in the private marginal cost schedule for the actor's activity. If so, these factors suggest strict liability is appropriate.

Examples of activities for which the externalized risk is relatively high are easy to suggest. The classic example is blasting in a residential area. Homeowners impose a minimal risk on a construction crew engaged in blasting. However, even when the construction crew is acting with reasonable care, it imposes a much greater risk on homeowners from debris and concussions caused by blasting.

The fourth component of Restatement § 520 goes to the question of reciprocity. If the defendant's activity is one of common usage, then clearly there is a reciprocal exchange of risk between the activity of the actor and the activity of a representative member of the population or community – in other words, $q_A = q_B$. Consider, for example, the activity of driving a car. Since many people own cars in the United States, the risk imposed by car driver A is reciprocated by the risks imposed on A by others.

The fifth component of Restatement § 520 – inappropriateness to place – poses the same question as the fourth component but from the opposite starting point. While the fourth component asks if the risk is reciprocated, the fifth asks if the risk is not reciprocated. If most people who live in a community would judge a certain activity as “inappropriate”, it follows that the activity must be one that is not commonly carried out within the community of interest. If the residual risk associated with the activity is high and it is inappropriate in this sense, then clearly it is a case in which the actor externalizes risk that is not reciprocated in general.

The fifth component has a second implication which is less clear on its face, but clearly implied by the model of this paper. An activity might have a high residual risk, and yet may also have a high external benefit. Having a fire company station located in your community may impose additional risk – of noise and of harm from fire trucks occasionally racing down your street – but it also provides the additional security of close access to firemen. Thus, even if the activity externalizes a relatively high level of risk (i.e., $q_A > q_B$), strict liability may be inappropriate if the external benefits are also relatively high ($w_A > w_B$). If both risks and benefits externalized are high, the activity should not be deemed inappropriate for the place in which it is carried on.

The sixth component of Restatement § 520 asks for a direct comparison of the activity's “value to the community” and its dangerous attributes. The language is obviously vague and probably incapable of precise specification. However, in terms of this model, the

language appears to have a clear meaning. The court should attempt some qualitative assessment of externalized risk and externalized benefit. If externalized risks seem to outweigh externalized benefit, then strict liability would be desirable on this score.¹⁹ The sixth component may seem redundant in light of my description of the second function of the fifth component. However, the sixth component is not redundant given the high likelihood that the fifth component would be narrowly viewed as nothing more than a reciprocity test.

The model of this paper provides an economic justification for the reasoning adopted in *Rylands v. Fletcher*. The defendant stored a large quantity of water in a reservoir on his property. The water escaped through ancient mine shafts under his property, flooding a neighbor's property. The court argued that storing a large quantity of water imposed an unusually high risk on neighboring landowners, with no reciprocal risk imposed by them and no offsetting benefit externalized to them. The court's rationale for strict liability is consistent with the implications of this paper's model. Moreover, the model here suggests a specific interpretation of the language used by the *Rylands* court. *Rylands* announces a rule of strict liability for "non-natural" uses of property that "escape" and cause damage to others, provided that the damage is the "natural consequence" of the escape and that the escape is not due to the plaintiff's fault. The model of this paper implies that "non-natural use" in *Rylands* should be understood to mean that the defendant brought something not naturally there onto his property and thereby imposed a non-reciprocated substantial risk on adjacent landowners which was not offset by some externalized benefit. The term "natural consequences" limits liability to harms that are foreseeable in relation to the risk generated. Lastly, the reference to the plaintiff's fault immunizes the defendant when the harm is caused in large part by the plaintiff's conduct.

The theory of this paper, which focuses on risk and benefit externalization rather than activity-level effects, is much easier to reconcile with the outcome of *Rylands* than the analyses of Shavell and Posner. Consider again the facts of *Rylands* and ask the following question: would strict liability be superior to negligence in terms of its effects on activity level choices? One could just as easily argue "no" as to argue "yes". It probably would not have been clear that strict liability would have caused a visible change in the water storage decisions of landowners in the period in which *Rylands* was decided. The technological alternatives probably were not obvious at the time. If the *Rylands* court had attempted a direct analysis of activity level incentives, it might well have decided that strict liability is inappropriate. The approach suggested by this paper's model, as well as the law, focuses on externalization of risk (and benefit) with little effort to analyze activity level incentives directly. As a method of explaining the law, and a guideline for courts to follow, the analysis of activity level incentives is probably ineffective.

¹⁹ Conversely, if externalized benefits exceed externalized risks, then strict liability is inappropriate. For a case in which the court recognized that strict liability would be inappropriate because the externalized benefits from the defendant's activity exceeded the externalized risks, see *Rickards v. Lothian*, [1913] A.C. 263. In *Rickards*, the plaintiff brought a strict liability claim on the theory that the defendant's decision to supply water to the building he owned imposed an extraordinary one on tenants. The court held that water supply is a reasonable activity that should not be subjected to strict liability.

B. Nuisance

This model applies easily to the case of nuisances, such as an activity that blows a plume of black smoke over your property. Even when carried on with care, the typical nuisance externalizes harm that is unreciprocated by other actors ($q_A > q_B$).

Indeed, the analysis just carried out for dangerous activities can be carried out with only minimal changes for the case of nuisances. The first three factors of Restatement § 520 would ask, in the case of a nuisance, whether the interference or annoyance to adjacent landowners would occur even if the activity were carried on with reasonable care. Again, this is equivalent to asking whether the activity externalizes more harm than is the norm in its area of operation. The fourth factor of § 520, applied to the case of a nuisance, would ask whether the activity is one of common usage. If, for example, everyone in the community burns their leaves in the fall, creating plumes of smoke that cross over the property of neighbors, then the harm externalized by any particular leaf-burner is reciprocated by the harms externalized by others within the community.²⁰ The sixth factor would ask whether the externalized risk is counterbalanced by a gain to the community. For example, the occasional noise of a fire station might be considered a nuisance were it not for the fact that the station also benefits neighbors substantially.

This paper's model suggests that the six part test of Restatement § 520 can be used as a test for determining whether an activity is a nuisance, which would help to clarify nuisance doctrine. Under this model, questions of reasonable care would play virtually no role in the analysis of nuisances.²¹

Even some of the narrower doctrines of nuisance law are easily explained within this paper's model. Consider, for example, the rule excluding compensation under nuisance law to an ultra-sensitive plaintiff.²² In asking whether strict liability should be applied to the defendant, the key question, in this model, is whether the defendant's externalized harms are different from those of the typical actor, including the victim. In other words, the proper test for strict liability under this paper's model focuses on the injurer's externalization relative to background risk externalization, rather than the victim's sensitivity. If the injurer's externalization was not substantially greater than the background level of risk externalization, then strict liability should not be applied to the injurer. This implication of the model easily resolves a case such as *Rogers v. Elliott*, in

²⁰ *Bamford v. Turnley*, 122 Eng. Rep. 27, 33 (Ex. 1862) ("reciprocal nuisance ... of a comparatively trifling character" are not actionable).

²¹ The general concept of reasonableness is applicable, under this analysis, as long as it is used in reference to the defendant's invasion, where reasonableness is determined by an examination of the degree of reciprocity in risk externalization and the degree to which benefits are externalized by the defendant's activity. However, the traditional "Learned Hand test" examination of the burden of precaution relative to avoidable harms should not play a role in nuisance doctrine. The language of Section 826 of the Second Restatement potentially confuses matters because it describes an invasion as unreasonable if the gravity of the harm outweighs the utility of the actor's conduct. Confusion would be less likely if Section 826 referred instead to the utility of the actor's "activity".

²² *Rogers v. Elliott*, 15 N.E. 768 (Mass. 1888).

which the plaintiff brought suit against the local church because he was unusually sensitive to the noise from the church's bell. The court ruled against the plaintiff on the ground that nuisance law did not provide compensation for ultra-sensitive plaintiffs. A more direct answer, implied by this model, is that if the average person in the community was not harmed by the church bell, then the ringing did not externalize substantially more harm than the background level of externalization in the community.²³

The rule that "coming to the nuisance" is not always a defense is also easily explained within this model. Consider the case of heterogeneous risks. Suppose there is a range of background activity risks running from high to extremely low. For example, some actors may be running factories that belch out large plumes of smoke, while other actors may be engaged in activities that externalize little risk to others, such as living in a house. A community might start off, in year one, with 99 factories and 1 home owner. In this setting, the harm externalized by the factory is not substantially different from the background externalization by others. A nuisance suit by the homeowner against the factory should not prevail, which is consistent with the law.²⁴ Over time, the community may change. Suppose by year twenty, there are 2 factories and 98 home owners. At this stage, the harm externalized by one factory is far in excess of the background externalization by other actors – treating this background externalization as a weighted average over all actors in the community. The home owner's nuisance suit against the factory should not be barred by the "coming to the nuisance" rule.²⁵

C. Negligence

In the *Rylands* decision, the court noted that the negligence rule applies in areas in which there is a roughly reciprocal exchange of risk among actors or where risks and benefits are symmetrically externalized. The court referred to traffic on the roads and on the seas as examples. And across the board, where the residual risks externalized by actors are roughly equal and small, the negligence rule applies.

Another example noted in *Rylands* is that of an owner of a business near a busy street. Although the business may not be throwing off risk onto nearby traffic, it can be said that the business settled on its location in full view of the risks, paying a price for the location which reflected those risks. The model of this paper implies that activity level (in this case, land acquisition) incentives are not altered by switching from negligence to strict liability.

In this model, negligence and strict liability provide the same incentives when there is a reciprocal exchange of risk (or in contractual settings in which the risks are apparent),²⁶ so there is no social advantage to be gained by replacing the negligence rule with strict

²³ Alternatively, one could defend the decision on the ground that the benefits of the church's activity were also substantial.

²⁴ E.g., *Bove v. Donner-Hanna Coke Corp.*, 258 N.Y.S. 229 (App. Div. 1932).

²⁵ *Ensign v. Walls*, 34 N.W.2d 549 (Mich. 1948).

²⁶ The contract setting in which risk is apparent can be viewed as a special case satisfying the risk reciprocity condition. When risks are apparent, and taken into account in contract terms, there is no unusual level of externalization because risks have been internalized through contract.

liability. However, this also raises the question why courts have not randomly replaced the negligence rule with strict liability. In other words, why does negligence remain the default rule in so many settings?

Several reasons can be offered. One is that for relatively small risks, it should be clear that actors will be more attentive to potential harms to themselves than to others. In addition, if we include a slight cost to bringing suit, there would be some loss in the deterrence incentive by switching, in this model, from negligence to strict liability when risks are small and reciprocal. These deterrence-based reasons suggest a real-world preference for negligence as the default rule. Strict liability would be preferable, given these considerations, only when risk asymmetry suggests a potential for welfare to be enhanced by holding high risk-externalizers strictly liable.

Another real-world reason for choosing negligence as the default rule is the greater administrability of a liability rule based on care rather than one based on causation. The negligence standard focuses on some untaken precaution that is usually framed by the plaintiff (Grady, 1989). As some courts and commentators have noted,²⁷ strict liability requires the court to determine which of several causes should be assigned liability. Holmes argued that these questions would force courts to resolve intractable problems.²⁸

The model in this paper simplifies the analysis of strict liability by assuming identifiable causation. But in the real world causation is not always easy to identify, which suggests an additional reason to restrict the scope of strict liability. Strict liability should be limited to setting in which causation is easily established.

D. Duty

This model suggests that there may be pockets of law in which legal rules are designed either to subsidize the actor's activity or to prevent imposing liability that would reduce activity levels too far below the socially optimal level. The most commonly observed subsidy is relief from the duty to take care. Relieving an actor of the duty to take care immunizes the actor from liability for choosing not to take care.

Since relieving an actor of the duty to take care provides him an incentive to set his care level at zero, we should observe this type of subsidy in narrow settings. In particular, given that the risk of harm increases when an actor reduces his care level, relief from the duty to take care should be observed in those settings in which the increase in the risk of harm, induced by immunizing the actor from liability, is likely to be slight. Overall, subsidization, in the form of a relaxed duty of care, should be observed when the external benefit of the actor's activity is likely to be relatively large and the resultant increase in the likelihood of harm is likely to be slight ($p_A \approx q_A$, $q_A \leq q_B$, $w_A > w_B$).

²⁷ Brown v. Collins, 53 N.H. 442 (1873).

²⁸ Holmes (1881), at 90-92.

One example of an area in which actors are relieved of the duty to take care is the rescue setting. In particular, courts hold that a rescuer does not have a duty to take care *for his own safety*.²⁹ This example fits well with the implication of this paper's model. First, a rescuer obviously has a genetically-hardwired incentive to worry about his own safety, even if he is going to be compensated in full for his harms due to the negligent party. Relieving a rescuer of the duty to take care for his own safety is unlikely to lead rescuers to abandon the survival instinct and with it the incentive to take care for their own safety. Second, rescue is an activity that most societies, throughout the ages, have considered heroic and worthy of praise. Most societies have viewed rescue as an activity with relatively large external benefits. Given these factors, rescue would appear, under this model, to be an ideal activity to subsidize, and the law in fact subsidizes the activity by relieving rescuers of the duty of self-care, although they lose the subsidy if they are reckless.

In addition to rescue, there are other activities in which courts have relieved actors of a duty of care. For example, landowners do not have a duty to take care for trespassers.³⁰ The external benefit that is encouraged by this rule is not as easy to see as in the case of rescue. However, imposing a duty of care for a trespasser on a landowner would transfer part of the property's value to the trespasser. In a low transaction-cost setting, there is no reason for the law to effect such a transfer; the would-be trespasser can bargain and pay for the level of care that he would like to see the landowner adopt. Given this, and given the trespassers ability to avoid the harm by staying off the landowner's property, the subsidy provided by the no duty rule in this setting is simply a complement to the protection provided by trespass law to landowners.

Landowner liability law imposes different duties on landowners in the cases of invitees and licensees. In the case of an invitee, typically a business visitor, the landowner is liable for latent defects in the property even if the landowner was not aware of them. In the case of a licensee, typically a social visitor, the landowner is liable only for defects of which the landowner is aware. This difference is justifiable, in terms of this paper's model, because licensees are often in a position to become aware of the state of the landowner's property, like the buyer who is aware of the risks of the seller's product (equations (13)-(15)). Invitees, on the other hand, usually have no relationship with the landowner that would allow them to become familiar with or to form a relatively accurate prediction of the condition of his property. They are in the same position as a buyer who is unaware of the risk characteristics of the seller's product. Strict liability for latent defects corrects activity levels in the invitee case, while it would be unnecessary in general in the licensee case.

E. Market Transactions and Strict Liability

Priest (1985) has raised important and troubling questions about the foundations and modern practice of products liability law. Still, the model of this paper provides an

²⁹ Eckert v. Long Island R.R., 43 N.Y. 502 (1871), Wagner v. Int'l Ry. Co., 133 N.E. 437 (N.Y. 1921).

³⁰ See, e.g., Buch v. Amory Manufacturing Co., 44 A. 809 (N.H. 1897).

economic framework that is generally consistent with the law. In general, products liability lawsuits fall into three categories: manufacturing defect, design defect, and failure to warn. Strict liability applies to only the first category: manufacturing defect litigation. Design defect claims are resolved under a risk-utility test that is similar in many respects to the standard negligence test. Failure to warn disputes are resolved under the traditional negligence test.

The assignment of liability rules (strict liability, negligence) across the categories of product liability litigation is consistent with the predictions of this paper's model. First, note that for mass-produced products today, risk externalization is unilateral. The seller externalizes risk to the buyer, not the other way around. This immediately suggests that strict liability may be preferable to negligence. The other key factor suggested by the model here is whether consumers are or should be aware of the risk characteristics of the product. If they are aware, then negligence and strict liability lead to equivalent outcomes.

Manufacturing defect claims involve errors or glitches of the manufacturing process. Because of the manufacturing glitch, 1 out of every 1000 units of the product may be defective in a way that is dangerous to the consumer. If consumers are unaware of this risk, which is especially likely in the early stages of the product's life cycle, the market outcome will be one in which there is too much consumption of the product relative to the social optimum. The strict liability rule that applies to manufacturing defect claims corrects what would otherwise be a market failure.

Of course, even this correction is limited to the settings in which over-consumption of risk is likely. When the product is likely to externalize benefits, strict liability is rejected. For example, although many vaccine cases are resolved under the statutory scheme set up by the National Child Vaccine Injury Act,³¹ the Second Restatement classifies them as "unavoidably unsafe" products exempt from the rule of strict liability.³² In this special case, the law follows the prediction of this model by rejecting the strict liability principle because of the positive externalities associated with consumption.

Design defect claims involve design features that expose consumers to the risk of physical harm. The key difference, in terms of this model, between design and manufacturing defects is that the former type of defect is more observable to the consumer. Liability for design defects is not strict. Manufacturers are held liable only for choosing a design that exposes the consumer to an inordinate risk given the design's benefits relative to some safer alternative. Given its effort to balance costs and benefits, the risk-utility test applied to design defects is closer to a negligence rule than a strict liability rule. The risk-utility test is essentially a negligent design theory, and there were examples of such claims in the common law long before the introduction of products liability doctrine.³³

³¹ 42 U.S.C. §§ 300aa et seq.

³² Restatement (Second) of Torts, § 402A comment k (1966).

³³ See, e.g., *Cooley v. Public Service Co.*, 10 A.2d 675 (N.H. 1940).

The failure to warn category serves as an additional example that strict liability is not the general rule in products liability. The law on failure to warn applies to design defect claims. Suppose, to set aside the case of negligence in design, the product has a non-negligent design, and the consumer sues solely because the seller failed to warn of risk characteristics. The manufacturer is not strictly liable for failing to warn of a potential risk connected to the design. In this respect the law, consistent with this paper's model, appears to reflect a background assumption that consumers are generally aware of the risks generated by many ordinary products.

In the labor market setting, one could argue that risk externalization is asymmetric or unilateral in many settings. The employer may choose or design a worksite that presents a risk of physical harm to employees, but employees seldom do anything that poses a risk of physical or property harm to the employer. Given this asymmetry in risk externalization, this paper's model would seem to imply at first glance a preference for strict liability. However, strict liability was not the rule of the common law; the liability of employers was limited to their own negligence.

This can be justified in economic terms by the greater scope for employees to gain a full understanding of the risks of the workplace and even to bargain over those risks. Chief Justice Shaw's opinion in *Farwell* argued that employees would bargain for wage rates that reflect the risk characteristics of regular features of the worksite.³⁴ If employees' perceptions of risk were relatively accurate, strict liability could not improve upon the activity level incentives provided by the negligence rule.

V. Conclusion

This paper presents a positive economic model of strict liability. The key innovation of this model is the explicit incorporation of risk as a cross-externalized cost of activity, which is evident in many real world settings such as transportation on the roads or on the seas. While the new model does not necessarily upset the general conclusions of the Shavell-Posner analysis, it does alter the analysis significantly. The framework of this paper provides a simpler and more straightforward way of evaluating the justification for strict liability, because it focuses on relative risk externalization rather than the ability of the law to influence activity level choices. The model's implications fit closely with the case law and doctrine on strict liability, negligence, and duty.

³⁴ *Farwell v. Boston and Worcester Rail Road Corp.*, 4 Metcalf 49 (Mass. 1842).

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